

ABSTRACT

In order to deposit a high-grade and extra-thin film without causing damage to the substrate at a relatively low temperature,

the present invention provides a method for forming a cluster which is a lumpy group of atoms or molecules of a reactive substance at the room temperature under the atmospheric pressure, irradiating electrons onto clusters, irradiating the resulting cluster ions onto a substrate surface by accelerating by an acceleration voltage, and at the same time or alternately, irradiating one or more component gases of the deposit film onto the substrate surface, thereby depositing a thin film on the substrate surface through reaction.